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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/587,402	07/26/2006	Takatsugu Yamada	XA-10623	7032

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MILES & STOCKBRIDGE PC  
1751 PINNACLE DRIVE  
SUITE 500  
MCLEAN, VA 22102-3833

EXAMINER
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JOHNSON, PHILLIP A

ART UNIT	PAPER NUMBER
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3656

NOTIFICATION DATE	DELIVERY MODE
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03/25/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/587,402	<b>Applicant(s)</b> YAMADA ET AL.	
	<b>Examiner</b> PHILLIP A. JOHNSON	<b>Art Unit</b> 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2010.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Claims***

The communication filed on March 1, 2010 is acknowledged. Claims 1 – 14 are pending in this application.

The 102/103 rejection cited in the previous office action has been withdrawn. The Applicant has correctly determined that the previously cited prior art reference Shoda et al. USP 7,416,216 does not qualify as prior art. Therefore, the Final Rejection dated October 1, 2009 has been withdrawn.

A new Final Rejection based on newly cited references follows.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1 – 7, 9 – 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (WO 3104062) in view of Honda et al. (USP 6,733,039).**

Re claim 1, Yamada (Fig. 9 in view of Fig. 4) discloses torque transmitting portions 6 and 8 that are respectively disposed on an outer surface of the male shaft 1 and on an inner surface of the female shaft 2; a preload portion including a rolling member 7 or spherical body (claim 10) that is disposed between the outer surface of the male shaft 1 and the inner surface of the female shaft 2 at a different position from a position where the torque transmitting portions 6 and 8 are located and that rolls when the male shaft 1 and the female shaft 2 move

Art Unit: 3656

relative to each other in the axial direction; an elastic member 40, or leaf spring (claim 12) that is disposed adjacent to the rolling member 7 in the diametral direction and that biases the male shaft and the female shaft through the rolling member; the preload portion transmitting torque between the male and female shafts when a torque is applied to one of the male and female shafts; the torque transmitting portions 6 and 8 include a projection elongated in the axial direction and having a substantially arc sectional shape formed on the outer surface of the male shaft 1; a groove 4 elongated in the axial direction and having a substantially arc sectional shape formed on the inner surface of the female shaft 2.

Yamada does not expressly torque transmitting portions with a gap there between when no torque is applied.

Honda (Fig. 3 and 4) teaches torque transmitting portions 42 and 32/51b with a gap there between when no torque is applied (col. 3, lines 11 – 18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yamada to include torque transmitting portions with a gap there between when no torque is applied, as taught by Honda, for the purpose of providing an effective means to absorb micro-vibrations from the steering gear, thereby improving performance within the normal steering angle range (col. 1, lines 57 – 61).

Accordingly, Honda discloses the torque transmitting portions 42 and 32/51b coming into contact with each other so as to transmit torque there between when the torque applied to one of the male 30 and female 31 shafts

Art Unit: 3656

exceeds a predetermined value (col. 3, lines 11 – 18). Honda further discloses a rotation angle A of the male shaft 31 with respect to the female shaft 30 corresponding to the gap G between the torque transmitting portions 42 and 32/51b is less than a rotation angle B of the male shaft with respect to the female shaft corresponding to a maximum deflection capacity of an elastic member 32 (inherent to structure according to Fig. 3 and 4, as the gaps between the torque transmitting portions 42 and 32/51b are smaller than the max flex distance of the elastic member 32 between member 41 and 51).

Re claim 2, Honda does not expressly disclose the rotation angle A being set from 0.01 degrees to 0.25 degrees. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Honda such the rotation angle A is set from 0.01 degrees to 0.25 degrees, since it has been held that discovering optimum value or a result effective variable involves only routine skill in the art.

Re claim 4, Honda disclose the torque transmitting portions not in contact with each other torque until a torque applied to one of the male and female shafts exceeds a predetermined value (col. 3, lines 11 – 18).

Re claim 5, Yamada (Fig. 9) disclose the torque transmitting portions including a spline-fitting structure or a serration-fitting structure formed on the outer surface of the male shaft and the inner surface of the female shaft.

Re claim 6, Yamada (Fig. 9 in view of Fig. 4) discloses the preload portion having a first axial groove 3 disposed on the outer surface of the male shaft 1 and a second axial groove 5 disposed on the inner surface of the female shaft 2

Art Unit: 3656

opposite to the first axial groove, and the rolling member 7 and the elastic member 40 are disposed between the first axial groove 3 and the second axial groove 5.

Re claim 7, Yamada (Fig. 9 in view of Fig. 4) discloses a plurality of preload portions disposed between the male shaft and the female shaft, and the transmitting portions 6 and 8 are disposed between adjacent preload portions.

Re claim 9, Yamada (Fig. 9) discloses the preload portions disposed in the circumferential direction with an interval of 120 degrees having the torque transmitting portions in-between.

Re claim 10, Yamada (Fig. 9) discloses the torque transmitting portions disposed at the center in the circumferential direction between the preload portions.

Re claim 14, Yamada (Fig. 9 in view of Fig. 4) discloses a female shaft 2 and a male shaft 1 that are fitted together so as to transmit torque there between and to move relative to each other in an axial direction; torque transmitting portions 6 and 8 respectively disposed on an outer surface of the male shaft and on an inner surface of the female shaft; a preload portion including a rolling member 7 and an elastic member 40, the rolling member 7 being disposed between the outer surface of the male shaft 1 and the inner surface of the female shaft 2 at a different position from a position where the torque transmitting portions 6 and 8 are located and rolling when the male shaft and the female shaft move relative to each other in the axial direction; the elastic member 40 being

Art Unit: 3656

disposed adjacent to the rolling member 7 and biasing the male shaft 1 and the female shaft 2 with the rolling member 7.

Yamada does not expressly torque transmitting portions with a gap there between when no torque is applied.

Honda (Fig. 3 and 4) teaches torque transmitting portions 42 and 32/51b with a gap there between when no torque is applied (col. 3, lines 11 – 18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yamada to include torque transmitting portions with a gap there between when no torque is applied, as taught by Honda, for the purpose of providing an effective means to absorb micro-vibrations from the steering gear, thereby improving performance within the normal steering angle range (col. 1, lines 57 – 61).

Accordingly, Honda (Fig. 3 and 4) discloses a preload portion 41 and 51 transmitting torque between the male 30 and female shafts 31 when a torque applied to one of the male and female shafts is less than a predetermined value. Honda further discloses the torque transmitting portions 42 and 32/51b coming into contact with each other so as to transmit torque there between when a torque applied to one of the male 30 and female 31 shafts exceeds the predetermined value (col. 3, lines 11 – 18); and the torque transmitting portions 42 and 32/51b coming into contact with each other prior to a maximum deflection capacity of the elastic member 32 being reached (inherent to structure according to Fig. 3 and 4, as the gaps between the torque transmitting portions 42 and

Art Unit: 3656

32/51b are smaller than the flex distance of the elastic member 32 between members 41 and 51).

**Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada in view of Honda as applied to claim 7 above, and further in view of Grosse-Entrup (USP 4,103,514).**

Yamada does not expressly disclose the preload portions disposed in the circumferential direction with an interval of 180 degrees having the torque transmitting portions in-between.

Grosse-Entrup (Fig. 2) teaches preload portions 9 disposed in the circumferential direction with an interval of 180 degrees having the torque transmitting portions 1 in-between as a more efficient and economical arrangement that uses fewer preload elements for transmitting torque.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of Yamada, such that the preload portions are disposed in the circumferential direction with an interval of 180 degrees having the torque transmitting portions in-between, as taught by Grosse-Entrup, for the purpose of providing a more efficient and economical arrangement that uses fewer preload elements for transmitting torque.

**Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada in view of Honda as applied to claim 1 above, and further in view of Breese (USP 6,761,503).**

Yamada does not expressly disclose a solid lubricant film formed on the outer surface of the male shaft or the inner surface of the female shaft.



Breese (Fig. 6) teaches the use of a solid lubricant 50 formed on the inner surface of a female shaft 22a.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Yamada, such that a solid lubricant formed on the inner surface of a female shaft, as taught by Breese, for the purpose of minimizing the amount of force that is required to effect relative movement with respect to a telescopically coupled male shaft (col.1, lines 65 – 67).

### ***Response to Arguments***

Applicant's arguments with respect to claims 1 – 14 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

Art Unit: 3656

calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PHILLIP A. JOHNSON whose telephone number is (571) 270-5216. The examiner can normally be reached on MON - FRI, 7:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/587,402

Page 10

Art Unit: 3656

/PHILLIP A. JOHNSON/  
Examiner, Art Unit 3656

/Thomas R. Hannon/

Primary Examiner, Art Unit 3656